

1.2 Functions & Graphs

Function: a relation in which for every input there is exactly one output.

(Passes VLT)

1.  $A(s) = s^2$

2. $V(r) = \frac{4}{3}\pi r^3$

$V(d) = \frac{4}{3}\pi \left(\frac{d}{2}\right)^3$

$d = 2r$
 $r = \frac{d}{2}$

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Domain: Input, x-values
independent

Range: Output, y-values
dependent

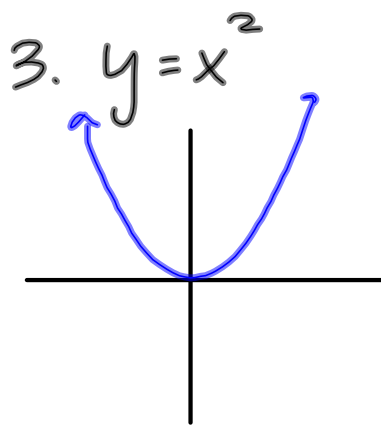
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Domain Restrictions: RS #22

1. If $f(x) = \frac{1}{x}$ then $x \neq 0$.
2. If $f(x) = \log_b x$ then $x > 0$.
3. If $f(x) = \sqrt{x}$ then $x \geq 0$.

Finding Range: Graphically.
Find Asymptotes

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$$D: (-\infty, \infty)$$

$$R: [0, \infty)$$

$$\{x \mid x \in \mathbb{R}\}$$

$$\{y \mid y \geq 0\}$$

4. $f(x) = \frac{1}{x+5}$

$$x+5 \neq 0$$

$$x \neq -5$$

$$D: (-\infty, -5) \cup (-5, \infty)$$

$$R: (-\infty, 0) \cup (0, \infty)$$

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To find H.A.

1. If deg. of num. < deg. of denom then
H.A. @ $y = 0$
2. If deg. of num = deg. of denom then
 $y = \frac{a}{b}$
(a, b are leading coeff.)
3. If deg. of num. > deg. of denom.
no H.A. → Slant

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5. $y = \sqrt{4-x^2}$ Semi circle!

$y^2 = 4-x^2$
 $x^2 + y^2 = 4$

D. $4-x^2 \geq 0$
 $4-x^2 = 0$
 $4 = x^2$
 $x = \pm 2$

D: $[-2, 2]$ R: $[0, 2]$

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$$6. g(x) = \sqrt{9-x^2}$$

$$9-x^2 \geq 0$$

$$D: [-3, 3]$$

$$R: [0, 3]$$

$$7. y = \frac{1}{\sqrt{1-x^2}}$$

$$D: (-1, 1)$$

$$R: [1, \infty)$$

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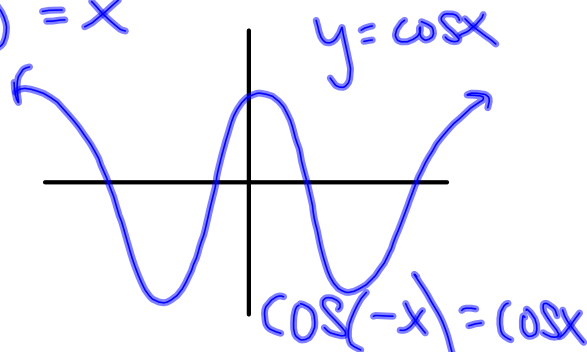
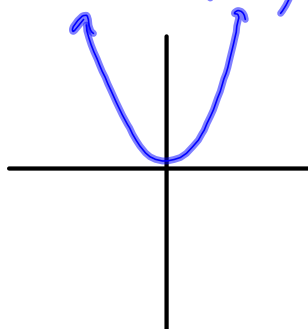
Even Fncs :

symmetric over y-axis

$$f(-x) = f(x)$$

ex: $f(x) = x^2$

$$f(-x) = (-x)^2 = x^2$$



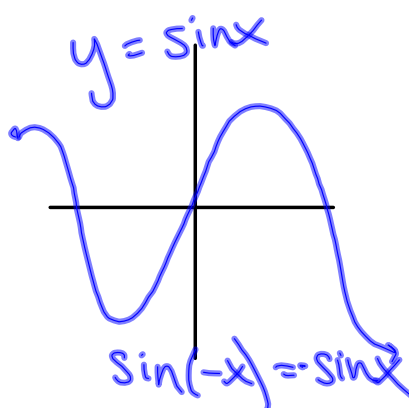
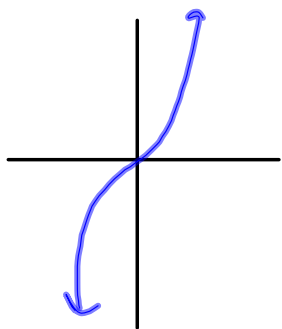
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Odd Fncs :

Symmetric to origin

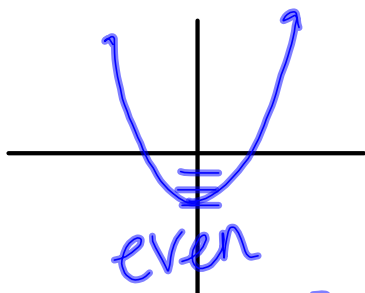
$$f(-x) = -f(x)$$

ex: $f(x) = x^3$
 $f(-x) = (-x)^3 = -x^3 = -f(x)$



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8. $f(x) = x^2 - 3$



$$f(-x) = (-x)^2 - 3$$

$$f(-x) = x^2 - 3 = f(x)$$

✓

9. $y = x^3 + 6$

$$f(-x) = (-x)^3 + 6$$

$$f(-x) = -x^3 + 6$$

$$-f(x) = -(x^3 + 6)$$

$$-x^3 - 6$$

neither

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10. $g(x) = 4x - x^3$
 $g(-x) = 4(-x) - (-x)^3$
 $= -4x + x^3$

odd

11. $f(x) = \begin{cases} \frac{x+3}{x^2} & x < 0 \\ \frac{x}{4x} & 0 \leq x < 2 \\ 4x & x \geq 2 \end{cases}$ fixed!

x		y
-2		1
0		3

x		y
0		0
2		4

x		y
2		8

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12. $g(x) = \begin{cases} \frac{4-x^2}{2} & x < 1 \\ \frac{3}{2}x + \frac{3}{2} & 1 \leq x \leq 3 \\ x+3 & x > 3 \end{cases}$

x		y
1		3

x		y
1		3
3		6

x		y

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